

The Conversion of Electronic Records to Microfilm

Introduction

Using the Kodak Document Archive Writer Model 9620 (DAW), the North Carolina State Archives is now able to offer a fee-based service that enables state government agencies to convert scanned images or “born digital” records—those created solely in digital form—to archival microfilm for low-cost, long-term storage and access.

The State Archives offers this service because microfilm processed in accordance with archival standards is a stable, low-risk medium that can enhance the survivability of digital files over time. Digital files are a series of 1s and 0s that need to be mounted onto hardware loaded with the correct software to make them readable to the human eye, whereas microfilm can always be read by the human eye and is therefore protected from technological obsolescence. In addition, quality microfilm can also be used to recreate digital files should the original digital files become corrupted or destroyed.

The State Archives will only work on projects that support its primary mission to collect, to preserve, and to make available for public use historical and evidential materials relating to North Carolina.

Additional information on best practices in recording electronic images on microfilm is available from the Property Records Industry Association (PRIA) at <http://www.pria.us/>, which offers a publication of Recording Electronic Images on Roll Microfilm Best Practices:

http://www.pria.us/CommitteeDocs/ArchivalBackupDisasterRecovery/2007/RecordingDigitizedAndDigitalImagesOnMicrofilmAdoped072407_FINAL.pdf

Technical limitations of the DAW

While the DAW accurately reproduces electronic files bi-tonally—in pure black and white-- there are some limitations with this equipment.

- It cannot accurately reproduce grayscale digital images, such as photographs, or documents that require the capture of faint or very fine lines, such as light or faded handwriting.
- It produces 16mm film which is most suitable for use with documents that are letter-, legal-, and ledger-sized(or B-size).
- Agencies with images of larger format documents (sizes C, D, or E) should utilize a vendor to preserve these images on 35mm microfilm.

Recommendations

The records that are most suitable for conversion from images to microfilm by the DAW are (as indicated by the applicable records retention schedule):

- Records that are of permanent or long-term value.
- Records that have a high likelihood of being used in litigation. An agency may suffer adverse financial and legal consequences if they are unable to produce records needed during litigation at a remote point in the future.
- Records that are subject to statutory or other requirements, which require secure off-site storage.

Requirements for Submissions

Because microfilm created using the DAW is intended to preserve records of enduring value to the highest archival standards, the State Archives has set the following minimum requirements for the submission of electronic files.

Resolution, File Format, and Scanning

- Electronic files must have a minimum resolution of 300 dpi in black and white mode. The Archive Writer will convert documents with higher dpi values, but this will not result in the production of better microfilm and is generally not recommended.
- Files must be in an uncompressed .TIFF file format with a maximum file size of 8 MB per image.
- If using a flatbed scanner for image capture, images should be cropped to reduce excessive, surrounding space, but should retain a small border to show that the entire document has been captured.

The management of scanned records should follow quality assurance and quality control measures established through procedural documentation, training programs, the use of audit trails, and audits as utilized by the submitting state government agency pursuant to recommendations in the “**Guidelines for Digital Imaging Systems.**” This document is located on the Government Records Branch website, Department of Cultural Resources, Archives and Records Section

(http://www.ah.dcr.state.nc.us/records/e_records/default.htm). The Guidelines should be consulted by any state government agency that is considering the implementation of a digital imaging system, regardless of the need to convert scanned images to microfilm.

File Format Conversion

- The State Archives can only accept .TIFF images. State government agencies maintaining other file formats should explore the use of file conversion software.
- The use of such software would, for example, enable the conversion of electronic records from .PDF to .TIFF or from .DOC to .TIFF.
- If conversion software is used, fonts should be embedded in the original document. Many .PDF documents including PDF/A use embedded fonts.
- The conversion process should be thoroughly tested and documented as part of the procedural documentation and audit trails associated with the project.

File Naming

Because the DAW creates a linear medium (microfilm) from a group of images, complying with file-naming requirements is critical to the production of quality and useful microfilm. The computer associated with the DAW sorts images prior to film production. The retrieval of the images on microfilm will be difficult if they are not sorted as anticipated. Not all computers sort lists the same way. When transferring electronic records, the use of the standardized naming convention explained below guarantees that the computer associated with the DAW will sort the submitted files in the same way as the computer that was used to create the files.

- File names should be no longer than 25 characters and must be alphanumeric with no special characters. Allowable characters in file and folder names include letters, numbers, and underscores.

- Do not leave blank spaces in the file name. Use underscores instead.
- The preferred file naming convention is simply: 00000001.tif
00000002.tif
00000003.tif
- When using numbers, make sure that the number of characters is consistent to ensure that the files are accurately sorted by the computer. For example:
10.tif
100.tif
2.tif
are not sorted correctly, whereas the following files are:
002.tif
010.tif
100.tif
- The file name submitted by the state government agency is discarded during the conversion process and will not be transferred to the film.

Folder Structure and Image Marks

Just as using file-naming conventions is important to the production of quality microfilm with the DAW, folder structure also plays a critical role in converting electronic images to microfilm. The DAW cannot accommodate deep file structures, e.g. multiple levels of hierarchy, when converting the images to microfilm. Some important guidelines for suitable folder structures include:

- Do not submit empty folders for filming. If the DAW encounters an empty folder, it will stop the conversion.
- There are also limitations as to how many levels into a folder structure the DAW will go.
 - If images are submitted as multi-page TIFFs (e.g. more than one image per filename) they may be only one folder from the root of the directory and cannot have a file size larger than 8 MB.
 - Single-page TIFFs (e.g. one image per filename) may be no more than two folders from the root (e.g. folder, subfolder, and image).
- Agencies with electronic files utilizing folder structures that do not conform to the above guidelines may still utilize the DAW provided they flatten the folder structure to meet the guidelines prior to transferring the images to the Archives. For additional information on this process, please contact Imaging Unit Head, Gina Fry: (919) 807-7339, gina.fry@ncmail.net.
- To support high-speed information retrieval, the DAW produces image marks on the microfilm according to the hierarchical structure in which the images are submitted. If a state government agency is interested in utilizing this feature, it will be incumbent upon the agency to purchase/support the associated equipment. Before relying on image mark retrieval, one should be aware that this technology could become obsolete.

Indexing

Each reel of film produced by the DAW should be indexed, either by means of a self-index or an externally-created index. Page numbering, chronological order or any other readily apparent organizational system inherent in the submitted images will self-index a reel of microfilm. Lacking that, an agency may submit an external index for inclusion on the microfilm.

- Agencies may create a database to serve as an external index for submitted information when, for example, the files do not follow chronological or numerical order (e.g. case files that are not completed in numerical sequence). However, as part of the conversion process state government agencies must submit either a printed copy of the database, which the State Archives will scan and then convert to microfilm, or the submitting state government agency may transfer scanned images of the database printout.
- The use of an external electronic index without submitting a copy to be converted to microfilm is not recommended because it counteracts one of the primary benefits of creating microfilm from digital content—protection from technological obsolescence.

Targeting

Targets are used to identify the records being filmed, to serve as finding aids to those records, to conduct quality assurance tests on the film, and to provide the certification needed to ensure that the filmed records will be accepted in court in lieu of the original records.

In order for each reel to be appropriately targeted:

- The submission must include the full name of the submitting state government agency, with all of the organizational layers named, the record's item number from an active records schedule, title of the records, and the date, page, or other range of content information for each reel, and a digital image of any external indices.
- The targeting information may be submitted in a variety of methods:
 - As the first pages of a submission of scanned images to be converted to microfilm.
 - As an email—the State Archives will create targets for state government agencies that supply the necessary information to do so.

File Transfer to the State Archives

- Transfer via an external storage media (e.g. external hard drive, CD-ROM, DVD, or USB technology).
- The State Archives is establishing a File Transfer Protocol (FTP) drop box. This document will be revised to cover that option when available.
- Once FTP drop box functionality is in place, no agency may transfer files via FTP without confirmation from the State Archives that it is ready to accept the transfer. Unsolicited files will be returned.

Batching Records for Transfer

- Approximately 2,400 300-dpi images of letter-sized documents will fit on a standard reel of 16mm microfilm.
- Ideally, the submitting state government agency should batch its jobs to match the number of images that will fit on a reel of microfilm.

Examples:

1,400 letter sized documents + 500 legal sized
2,400 letter sized documents
1,600 legal sized documents
1,350 ledger sized documents

- Only one record series or one item number from a records retention schedule should be placed on a reel of microfilm.
- No files or documents should be split between batches.
- The submitting state government agency must retain a copy of all files submitted to the State Archives until the State Archives notifies the submitting state government agency that the transfer to microfilm has been successfully completed.

Contact Us

Before a state government agency undertakes a project that will use the DAW, we recommend scheduling a consultation with its assigned Records Management Analyst at the earliest stages of the project to discuss issues such as targeting, batching, scanning, records scheduling, file formats, image marks, folder structures, or any other concerns that arise. See the Web page: <http://www.ah.dcr.state.nc.us/records/analysts.htm> for contact information.

For more information about converting digital files to microfilm images, please contact Gina Fry, at (919) 807-7333 or by email: gina.fry@ncmail.net.